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LIVELIHOOD STRATEGIES OF TIGER SHRIMP POST LARVAE COLLECTORS IN BACKKHALI RIVER ESTUARY, COX'S BAZAR OF BANGLADESH

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ABSTRACT

This study aim was to understand the livelihoods of tiger shrimp (*Penaeus monodon*, Fabricius, 1798) post larvae collectors in the Backkhali river estuary areas under Cox's Bazar district in Bangladesh during November 2010 to April 2011 where shrimp fry are caught. There are about 130-140 families and about 1000 people are living in the adjacent area. Most of the fry collectors have no land or house. They build house on Government (*khas*) land near the coast, the housing is mainly with earthen/bamboo or polythen. It was found that per month income of 30% of fry collector 5000-6000 taka and 48.3% have no toilet. Also it was found that 43.3% respondents had 2 meals per day only. The main occupations of this community are shrimp post larvae collecting, small treading, day labor, hilsha fishing, fishing labor, fish drying, salt production and farming.

Keywords: Livelihood strategy, Post larvae, Post larvae collector and Coastal area.

INTRODUCTION

Bangladesh is one of the marginal coastal countries of the Bay of Bengal and has a fertile tidal flooded coastal area suitable for shrimp culture. Coastal shrimp aquaculture in Bangladesh is mainly confined to two regions, namely: South-West region (Khulna, Satkhira and Bagerhat) and South-East region (Cox's Bazar). It has been estimated that approximately 2 billion shrimp fry are collected annually from wild sources (Banks, 2003). With respect to fresh water prawn (*M. rosenbergii*) more than 90% of the total PL is derived from natural sources and in the case of black tiger shrimp (*P. monodon*), more than 50% is derived from wild sources (Banks, 2003). Shrimp seed collection has given employment opportunity for thousands of coastal landless and unemployed people (Angell, 1990; FAO/NACA, 1995; Islam and Wahab, 2005). Globally, there are more than 1 million people engaged on a part time basis collecting wild source PL (World Bank, 2002). A study estimated that about 0.52 million collectors were involved in shrimp seed collection along the estuaries and coastline of Bangladesh. Total PL collectors' family member in Cox's Bazar was 7512 which comprised a total population of 62200 where the number of male, female and children (below 18 years) were 16794, 17416 and 27990 respectively (Mostafa *et al.*, 2007). A number of comprehensive assessments on coastal capture fisheries, fry collection and ecosystems have been conducted in recent years in various countries (Graaf and Xuan, 1998; Turner *et al.*, 1999; Hoq, 2000; Hossain 2001). But few studies have focused on the patterns of livelihood of the fry collectors and the fishers (Hoq *et al.*, 1995). The peak period of shrimp PL harvesting is the middle of February in Cox's Bazar. In that time many people of the adjacent cost were lost their jobs due to the seasonal changes. The people who lost their jobs they have no alternative working option. For this manure they catch PL in the sea. The Bakkhali river originate from the South-eastern hills of Mizoram at India and flows through Naikhongchhari of Bandarban district and Ramu of Cox's Bazar district in Bangladesh and finally falls into Moheshkhali channel of the Bay of Bengal in Cox's Bazar. This estuary is heavily supported by small scale and multi-gear fisheries. These fisheries play a greater role in sustaining the livelihoods and ensuring the food security of large member of rural people. For this research paper the researchers have chosen a five point Likert scale format (Likert, 1932), for the measurement of livelihood strategies of shrimp PL collectors. This study seeks to describe and analyzed the livelihood of the PL collectors and to find out whether they have or have improved the PL based economies of the coastal community an income sources of household.

MATERIALS AND METHODS

The Bakkhali river estuary is located at North-West side of Cox’s Bazar town which adjacent with Moheshkhali channel. It is an important nursery ground of marine fishes, which is one of the most important wild tiger shrimp fry collecting areas of Bangladesh. For this purpose a combination of qualitative and quantitative methods were used during data collection. It’s conducted from November 2010 to April 2011. Quantitative methods derived from Participatory Rural Appraisal (PRA) techniques include participant observation, semi structured interviews, focus group discussion, resource mapping and seasonal calendar. This was complemented with survey of post larvae collector’s households through the use of questionnaires. Then it is sedated five point Likert scale. Quantitative data was analyzed through the use of Microsoft Excel and SPSS software. Simple descriptive statistics were used to describe the characteristics of households with the levels of income, the livelihood activities engaged in and asset status components. Qualitative data were analyzed through text analysis. Also combined mean value of all the attributes was calculated through the weighted mean of each individual attribute of every village. Ordinal scale-wise percentage occurrence of the each attribute was also calculated from the collected data.

RESULTS

Education level of shrimp PL collector

The mean value of education level of respondent’s was found 2.65 ± 0.97 , was significantly lower than the standard level (3) for sustainable livelihood. From the (Fig. 1), the highest frequency for “Informal Muslim Primary School (Maktab)” (45%) followed by the “Non Gov. Organization (NGO) school” (30%) and “Formal primary school” (11.7%).

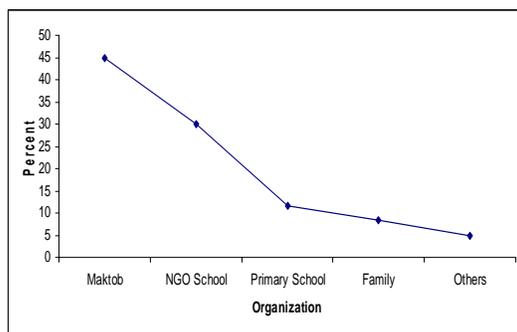


Fig. 1. The education level of respondent’s.

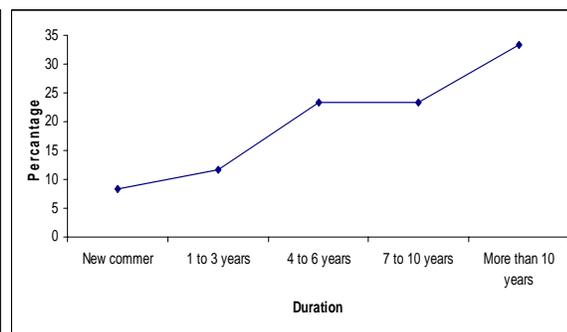


Fig. 2. Time of collecting fry of respondent’s.

Involving period with fry collecting

The mean value of involving period with fry collecting was found $3.61, \pm 1.29$ that was significantly higher than the standard level (3) for sustainable livelihood. From the (Fig. 2) it was observed that the highest frequency for “more than 10 years” (33.3%) followed by “7 to 10 years” (23.3%) and “4 to 6 years” (23.3%).

Amount of collected fry compared with five years before

The mean value of amount of collected fry compared with five years before was found to be $2.53, \pm 1.08$, the mean value of this variable was significantly lower than the standard level (3) for sustainable livelihood. From the (Fig. 3) it was seen that the highest frequency for “Fluctuate” (41.7%) followed by the “Less” (28.3%) and “More” (16.7%).

Income per month

The mean value of Income per month was found $3.46, \pm 1.30$, was higher than the standard level (3) for sustainable livelihood. From the (Fig. 4), it was observed that the highest frequency for “5 to 6 thousand” (30%) followed by the “Less than 5 thousand” (26.7%) and “9 to 10 thousand” (20%).

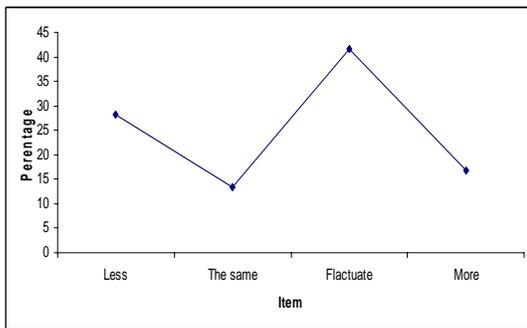


Fig. 3. Collected fry compared with five years before.

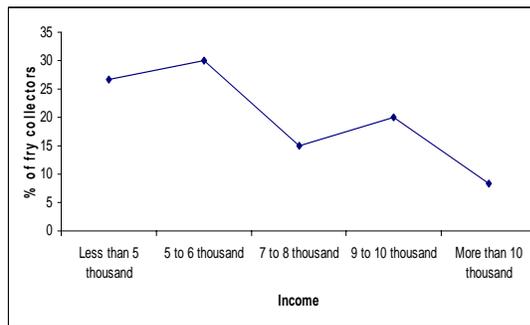


Fig. 4. Income per month from fry.

Type of housing

The mean value of this attribute type of house was found $4.13, \pm 0.95$ and it was significantly higher than the standard level (3) for sustainable livelihood. From the (Fig. 5), it was seen that the height frequency for “Kacha (earthen/bamboo)” (45%) followed by the “Kacha (polythane roof)” (30%) and “Kacha+Tin roof” (18.3%).

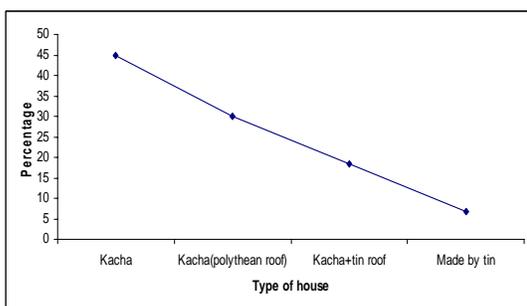


Fig. 5. The type of house.

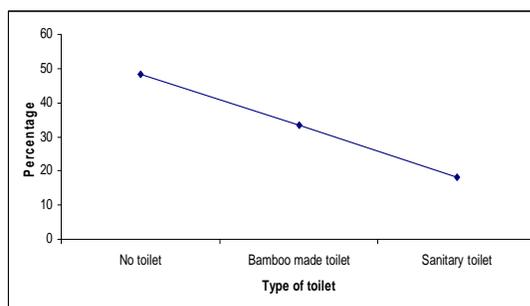


Fig. 6. Sanitation facilities of fry collector.

Sanitation facility

The mean value of sanitation facilities was found $3.30, \pm 0.77$, was significantly higher than the standard level (3) for sustainable livelihood. From the (Fig. 6) it was seen that the highest frequency for “No toilet” (48.3%) followed by the “Bamboo made toilet” (33.3%) and “Sanitary toilet” (18.3%).

Ownership of household land

The mean value of “Ownership of household land” was found $3.20, \pm 1.05$ and was significantly higher than the standard level (3) for sustainable livelihood. From the (Fig. 7), it was observed that the highest frequency for “Built in khas land” (53.3%) followed by “Built in others land” (26.7%) and “Own” (13.3%).

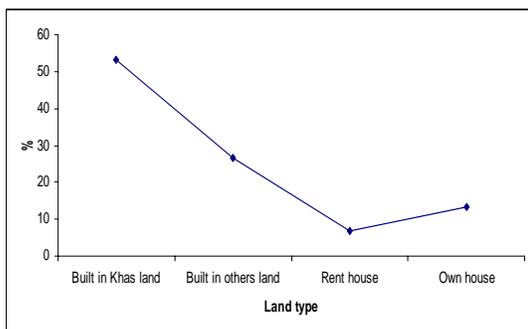


Fig. 7. Ownership of household land.

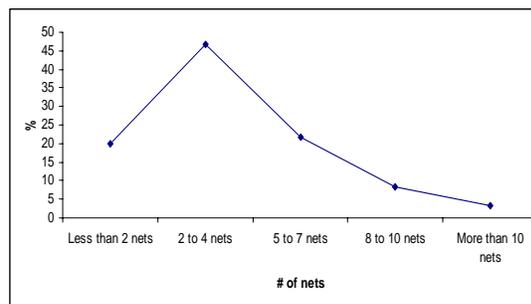


Fig. 8. Number of fry collecting nets.

Number of fry collecting net

The mean value of “Number of fry collecting net” was found 3.72, ± 0.99 , (%), was significantly higher than the standard level (3) for sustainable livelihood. From the (Fig. 8), it was observed that the highest frequency for “2 to 4 nets” (46.7%) followed by the “5 to 7 nets” (21.7%) and “Less than 2 nets” (20%).

Food availability

The mean value of the variable number nine “How do you consider your daily meal?” was found to be 2.90, ± 0.88 , was significantly higher than the standard level (3) for sustainable livelihood. From the (Fig. 9) it was seen that the highest frequency for “Occasionally food deficit” (38.3%) followed by the “Break even” (28.3%) and “Usually food deficit” are the same (28.3%).

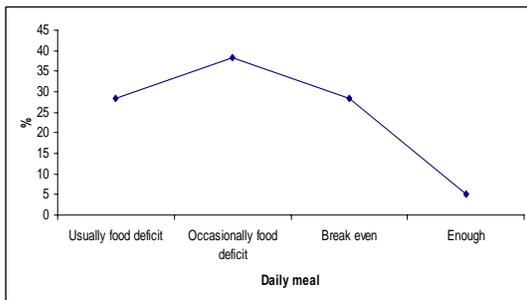


Fig. 9. Consider your daily meal.

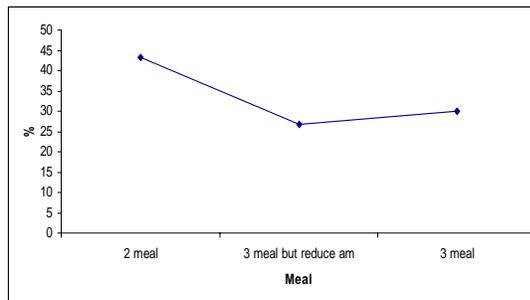


Fig. 10. Meal per day.

Food consumption per day

The mean value of “Meal per day” was found 3.13, ± 0.85 , was significantly higher than the standard level (3) for sustainable livelihood. From the (Fig. 10) it was observed that the highest frequency for “2 meals” (43.3%) followed by the “3 meals” (30%) and “3 meals but reduce amount” (26.7%).

Participation of development partners to improve the fry collectors’ livelihood

The mean value of “How they work with yours to increasing your livelihood” was found 3.08, ± 1.45 , was all most same to the standard (3) level for sustainable livelihood. From the (Fig. 11) it was observed that the highest frequency for “Supply drinking water” (26.7%) followed by “Gives loan” (23.3%) and then “Provide child education” (21.7%).

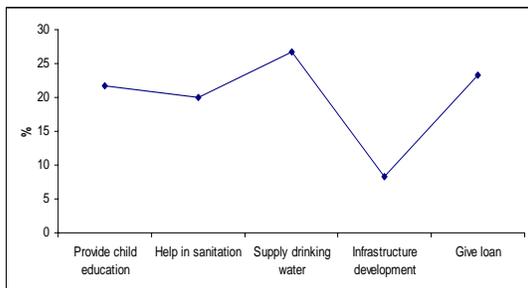


Fig. 11. NGOs work with PL collector community.

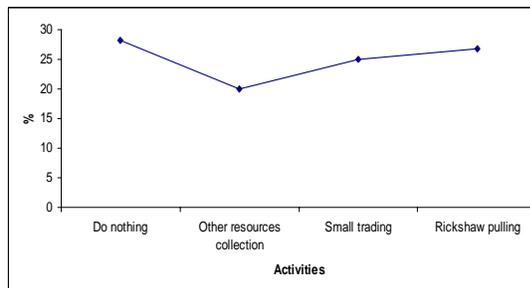


Fig. 12. Other income generating activities of fry collectors.

Other income generating activities of fry collectors

The mean value of “Other income generating activities” was found 2.50, ± 1.17 , was significantly lower than the standard level (3) for sustainable livelihood. From the (Fig. 12) it was seen that the highest frequency for “Do nothing” (28.3%) followed by “The rickshaw pulling” (26.7%) and “Small trading” (25%).

Role of women in PL collector’s livelihood

The mean value of “Role of women in PL collector’s livelihood” was found 2.95, ± 1.66 , was significantly lower than the standard level (3) for sustainable livelihood. From the (Fig. 13), it was

observed that the highest frequency was for “Helping at fry collection” (33.3%) followed by the “Do nothing” (26.7%) and “Small trading” (20%).

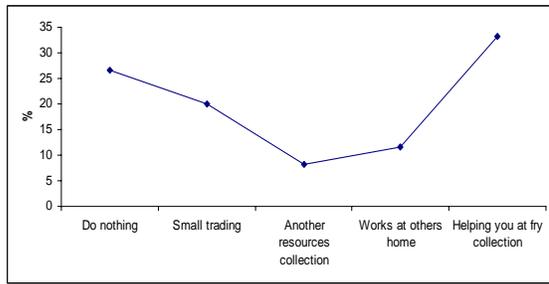


Fig. 13. Role of women in PL collector's livelihood.

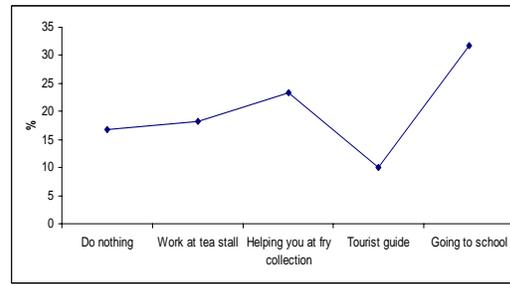


Fig. 14. Role of children in PL collector's family.

Role of children in PL collector's family

The mean value of “Role of children in PL collector's family” was found 2.78, ± 1.48 , was significantly lower than the standard level (3) for sustainable livelihood. From the (Fig. 14), it was seen that the highest frequency for “Going to school” (31.7%) followed by the “Helping at fry collection” (23.3%) and then “Work at tea stall” (18.3%).

DISCUSSION

The result of this attribute “No. of livestock” found that the PL collectors have various type of livestock's reared in their household. In this attribute most of the family have one types of livestock there as chicken (30%), duck (23%), cattle (5%) and horse (1.67%). The other families have two types of livestock's there was goat and chicken (5%), goat and duck (5%), cattle and chicken (1.67%). The some of the families have three types of livestock's there was cattle, goat and chicken (1.67%), cattle, chicken and duck (1.67%), horse, cattle and duck (1.67%) and goat, chicken and duck (6.67%). The result of this attribute “Electronically appliances available in the house” found that the PL collectors have various types of electrical appliances in their household. In this attribute most of the family have one types of electrical appliances was clock (38%), radio (16.67%) and mobile (6.67%). The other families have two types of electrical appliances there was mobile and clock (15%), mobile and radio (8.33%), radio and clock (5%). The some of the families have three types of electrical appliances there was TV, mobile and radio (3.33%), TV, mobile and clock (1.67%) and mobile, clock and radio (5%). From the result of “Education level of shrimp PL collector”, it was found that the shrimp fry collectors of Cox's Bazar prefer “Maktab” (45%) for their education but they believe that primary school is the best option for their children. The mean value of this variable was almost 3. The second preferable option for their education was the “NGO School” (30%). From this it may be said that the fry collectors are aware of their children education and trying to increase their livelihood. On the other hand, from the result of the attribute “How long have you been collecting fry?” it was found that people engaged “More than 10 years” (33.3) in fry collection is better in their livelihood. The mean value of this variable was almost 4. The second preferable option was “7 to 10 years” (23.3%) and “4 to 6 years” (23.3%). For this, it may be concluded that once they have been engaged in PL collection. They don't get other livelihood strategies. From the result of “Amount of collected fry compared with five years before” a “Fluctuating” (41.7%) PL abundance was found in the Cox's Bazar sea beach area. The second choice from this attribute was “Less” (28%) when compared with previous five years. It may be concluded that the abundance of PL is fluctuating day by day and generally lesser. From the fourth attribute “Income per month from fry collection” it was found that the maximum ensure for in the categories of “5 to 6 thousand” (30%). As the second choice from this attribute was “Less than 5 thousand” (26.7%). However the mean value of this attribute was found to be (3.46) it is significantly lower than the sustainability. In conclusion it may be said that the monthly income of fry collectors is not significant for a sustainable livelihood.

On the other hand, from the result of the attribute number 5 “Type of house” it was found that the majority answered for this categories was “*kacha* (earthen/bamboo)” (45%) for their house type but they believe that *pakka* (cement) is the best option for their house type. The second option of this variable was “*Kacha* (polythene)” (30%). The mean value of this variable was found to be (4.13) it is significantly higher than the standard level (3) of sustainability. From this it may be said that the living condition of PL collectors are not sustainable. From the result of the variable 6 “Type of toilet” it was found that the maximum of PL collectors answered for the categories of “No toilet” (48.3%) for their toilet type but they do not like this kind of toilet. The better option of this attribute was “Pakka toilet” or “Sanitary toilet” only (18.3%) respondent answered for “Sanitary toilet”. The mean value of this variable is (≤ 3). The second option for this variable “Bamboo made toilet” was (33.36%). For the statistical point of view the mean value falls in the third categories “Bamboo made toilet”. For this variable it may be said that the livelihood condition of the PL collectors is moderate. In contrast, for the result of the attribute 7 “Condition of house” it was found that most of the people gave their opinions for this variable was “Built in khas land” (53.3%). The better option was “Own house” for this attribute. The mean value of this variable was 3. The second choice for the condition of house was “Built in others land” (26.7%). For this attribute four variables were stated. The most people answered the last one. For the statistical point of view the preferable option was third “Built in others land”. For this variable it may be said that the livelihood of the PL collector’s community is not in the sustainable level as they want their own house for living.

From the result of the attribute number 8 “How many nets do you have?” it was found that the maximum people of that community have “2 to 4 nets” (46.7%). The better option was more than “10 nets” (3.3%). The second choice of the PL collector communities were “5 to 7 nets” (21.7%). From this point of view it may be said that the fry collectors are not sustainable at all. From the result of the variable number ninth “How do you consider your daily meal?” people of that communities answered that “Occasionally food deficit” (38.3%). The better option for this variable was “Enough”. The mean value of this variable was near about 3. The second choice was “Break even” and “Usually food deficit” (28.3%). The most answers goes to third one. From the statistical point of view the preferable option was “Break even”. From this attribute it may be said that the family members of PL collectors are passing moderate livelihoods. In contrast, from the results of the variable 10 “Meal per day” it was found that the maximum people answered were “2 meals per day” (43.3%). The mean value of this variable was almost 3. The second preferable choice for consider your daily meal was “3 meals” (30%) per day. For the statistical point of view the preferable answered was third one (3 meals but reduce amount). For this, it may be concluded that they are trying to increasing their livelihood strategies. On the other hand, from the result of the attribute number 11 “How the NGOs work with you to increase your livelihood?” it was found that the people prefer “Supply to drinking water” (26.7%). The mean value of this variable was 3. The second preferable option for consider the NGOs work with the PL collecting community was “Give loan” (23.3%). From this it may be said that the people of PL collecting community are involved with NGOs to burst up their livelihoods.

From the result of the attribute 12 “What do you do when there is no fry catch?” it was found that the most of PL collectors were answered “Do nothing” (28.3%). The better option for this variable was “Rickshaw pulling” (26.7%). The mean value of this variable was 2.5. The second preferable option for “What do you do when there is no fry catch?” was “Rickshaw pulling” (26.7%). For this question four variables are stated. The respondents answer was the last one. For the statistical point of view the preferable answered was the second one (Small trading) (25%). So it may be concluded that the PL collectors are able to change their livelihood condition through alternate income generation. From the result of the variable number 13 “What are the roles of women in your livelihood?” it was found that the PL collectors prefer “Helping you at fry collection” (33.3%). The better option for this variable is the same. The mean value of this variable was 3. The second preferable option for consider the role of women in the PL collectors livelihood was “do nothing” (26.7%). From this it may be said that the women are involved in the livelihood process of the PL collectors. In contrast, from the results of the variable 14 “What are the roles of children in your family?” It was found that the people of this

community prefer “Going to school” (31.7%). The better option for this variable was the same. The mean value of this variable was (≤ 3). The second preferable option for consider the role of children in the PL collectors livelihood was “helping you at fry collection” (23.3%). From this it may be said that the fry collector are aware of the children education and also trying to improve their livelihood condition. From the result of this attribute “No. of livestock” found that most of the fry fisher family reared livestock’s in their household. It was an others income generating sealing of this products and consumption for own to increase their livelihood. From the result of attribute 16 “Electronically appliances available in the house” most of the PL collectors house have one kind of electronically appliances this are clock or radio, some of this families have TV or mobile. This kind of appliances use only for their recreational purposes but when the natural disaster or illness occur they sealing their electronically appliances and cope this time.

CONCLUSION

The combine mean of all attribute were (3.37). From this result the researcher stated on the Likert scale and the scale was shown that the livelihood strategies of shrimp PL collectors are between “Moderate” and “Worse” level. But some attribute have four variable for this meaner the livelihoods of PL fisher are also going to decrease. So, the livelihood conditions of PL collectors were not a sustainable level.

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